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On the Means of facilitating the Observation of distant Stations in Geodetical Operations. By Lieutenant Thomas Drummond, of the Royal Engineers. Communicated April 14, 1826, by Lieut.-Colonel H. Colby, F.R.S. Read May 4, 1826. [*Phil. Trans.* 1826, p. 324.]

In consequence of the Report of a Select Committee of the House of Commons in June 1824, it was resolved that a new survey of Ireland should be undertaken; and the author was directed by Colonel Colby to consider the most effective means of rendering distant stations observable in the prevalent hazy state of that country.

After adverting to some of the usual means resorted to in such cases, and showing their inefficiency for his present purpose, and after noticing some unsatisfactory trials of brilliant pyrotechnical preparations, and of the combustion of phosphorus in oxygen gas, the author attempted applying to the purpose in view the brilliant light emanating from intensely heated quicklime. To obtain the requisite temperature, he passed a stream of oxygen through the flame of alcohol; and this jet being directed upon a small spherical piece of quicklime placed in the focus of a proper reflector, the light which it emitted was found to have 83 times the intensity of the brightest part of the flame of an Argand burner. Other substances, such as zirconia, magnesia, and oxide of zinc, were tried as substitutes, but were found very inferior as sources of light, when ignited, to quicklime from chalk, which moreover admits of being conveniently turned in a lathe into focal balls of any requisite dimensions. Mr. Drummond proceeds to detail the necessary application of this system to a case of considerable difficulty that occurred at the end of last season. Slieve Snaght, the highest hill of Innishowen (2100 feet), and 15 miles North of Londonderry, forms an important point in the triangulation connecting the North of Ireland with the Western Isles of Scotland. On the 23rd of August a conspicuous object was placed upon its summit, that it might be observed from Divvis Hill, near Belfast; but till the 26th of October it remained so enveloped in fog, as to frustrate all efforts at observation, the distance between the stations being $66\frac{1}{4}$ miles. On the 27th of October the author proceeded to the hill; and after some delay from tempestuous weather, brought the new instrument into use, which was brilliantly visible at the other station, and thus successfully terminated the observations.

This paper concludes with notices of some other proposed applications of these sources of intense light, more especially to certain lighthouses, in which the author thinks that the additional expense would be amply counterbalanced by the advantages of so powerful a source of illumination.

In a note appended to this paper by Mr. Herschel, he observes, that red, yellow, and green, appear to be the predominant rays in

the light emitted by the lime, but that none of the rays are entirely wanting. No black lines crossing the spectrum could be observed. He explains the cause of the peculiar coloured shadows thrown by this light, as compared with those of oil and day-light; and adds, that it is remarkable that the spectrum thus emitted by incandescent quicklime differs from that of the salts of lime, the characteristic colour in the latter case being thick red.

On the Production and Formation of Pearls. By Sir Everard Home, Bart. V.P.R.S. Read May 11, 1826. [*Phil. Trans.* 1826, p. 338.]

In his examinations of the organs of generation of the large freshwater muscle, the author often met with seed pearls, either in the ovarium, or connected with the shell upon which the ovarium lay; and he remarked at the same time that all Oriental pearls have a brilliant central cell, which in the common mode of boring them is destroyed, but which may be beautifully exhibited by carefully splitting the pearl into halves: this cell is just large enough to contain an ovum, which is formed upon a pedicle like the yolk of the pullet's egg, and is similarly discharged when completely formed. Thence Sir Everard concludes, that a pearl is formed upon the external surface of an ovum, which having been blighted, does not pass with the others into the oviduct, but remains attached to its pedicle in the ovarium, and in the following season receives a coat of pearl at the same time that the inner surface of the shell receives its annual supply. This conclusion, he observes, is verified by some pearls being spherical while others are pyramidal, in consequence of the pedicle, as well as the ovum, having been enamelled with nacre.

This paper concludes with an extract from one of the early volumes of the Philosophical Transactions, in which a corresponding account of the growth of pearls is announced by Arnoldi in 1673.

On Burrowing and Boring Marine Animals. By Edward Osler, Esq. Communicated February 15, 1826, by L. W. Dillwyn, Esq. F.R.S. Read May 25, 1826. [*Phil. Trans.* 1826, p. 342.]

The author's object in this paper is to describe the mechanism by which the boring and burrowing shell-fish form their habitations, and to explain some parts respecting the burrowing of other marine animals.

After showing that the Nereides bury themselves by the undulating motion which they employ in swimming, aided by the action of their bristly feet, and that the *Arenicola piscatorum* forms its imperfect arenaceous tube by the aid of a viscid secretion which exudes from the anterior half of the animal, he particularly describes the habits of the *Terebella conchilega*, showing that by a glutinous secretion it cements together particles of shells and sand, so as to form a collar, which is regularly and curiously lengthened into a tube; and when this is about an inch in length the animal proceeds to